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# United States Department of Agriculture,

## FOREST SERVICE,

GIFFORD PINCHOT, Forester.

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### SILVICAL LEAFLET 44.

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#### JACK PINE.

*Pinus divaricata* (Ait.) Du Mont de Cours.

Jack pine has only recently come to be regarded as commercially important. Its small size and the relatively inferior quality of its wood, as compared with that of white and of red pine, have prevented its extensive use for lumber. It is, however, of considerable economic importance since it is able to grow on poor and dry sands, thus giving them value for timber production and at the same time preventing them from drifting.

#### RANGE.

Jack pine grows farther north than any other American pine except lodgepole. Its northern limits reach from Hudson Bay to the Mackenzie River in latitude  $65^{\circ}$  north. It extends south to northern New England, New York, and the southern shores of Lake Michigan, and west to Minnesota and the eastern foothills of the Rocky Mountains in northern Alberta and Yukon Territory. In the United States it is most abundant in the sand plains of eastern Michigan, Wisconsin, and Minnesota.

#### CLIMATE.

Its northern range subjects jack pine to a cool climate, varying in humidity from the dry sand plains of Minnesota to the moist region about Quebec. The growing season within its range is from 3 to 4 months. The summers are warm but not hot; the winters are cold, but the ground is usually protected by heavy snowfall. Although jack pine characteristically grows in dry situations, it seems to demand a moderate rainfall and does not occur naturally where the average precipitation is much below 25 inches.

#### ASSOCIATED SPECIES.

Jack pine grows typically in pure stands but is often found in mixture with red or Norway pine and scrubby oaks. On better soils it often associates with white pine and also with aspen, paper birch, and

other broadleaf trees. On soils better adapted to it than to red pine, the jack pine may prove an undesirable associate of the more valuable tree by interfering with and retarding its growth.

#### HABIT.

Jack pine is a small tree. In the United States mature stands commonly average not more than 70 feet in height and 10 inches in diameter. In the best situations the tree may attain a height of 100 feet and a diameter of 18 inches. It reaches its largest size in Minnesota. Its form varies with the situation. On poor, sandy soils it has, when in dense stands, a straight, fairly clean bole, and a narrow, ragged crown, while on loamy soils the stands commonly contain fewer trees per acre, with larger crowns. Ultimately, the tree produces larger and more valuable timber on such soil than on sands. Open stands or scattered specimens of jack pine are very scrubby and limby, with a rough resemblance to orchard trees.

Unlike most pines, which send out lateral branches once a year so that the age of young trees can be told by these whorls, the young jack pine ordinarily sends out more than one set of these branches a year.

Jack pine has a very deep tap root, and the lateral roots, particularly on loose sands, spread for a very short distance and then descend vertically. On heavy soils the tap root is still present, but the laterals are more spreading.

#### SOIL AND MOISTURE.

The coarse, dry, deep sands of the flat, glacial plains are the natural home of the jack pine. Its deep root system and small demands upon soil moisture enable it to thrive on poor soils and to withstand drought better than most of its associates.

#### TOLERANCE.

Jack pine is less tolerant than red pine, white pine, or any other of its associates. Even a moderate amount of shade will suppress the tree, but because of its rapid growth, hardiness, and reproductive power it is able to compete with other species.

#### GROWTH AND LONGEVITY.

The growth of jack pine is extremely rapid in youth. At 10 years of age, trees on poor soil are often 18 feet in height, while on good soils they are sometimes more than 20 feet high. The maximum height growth is reached when the tree is from 7 to 10 years old, and at this age a rate of 3 feet per year is not uncommon. At 60 years, on sandy soils, trees in crowded stands range from 5½ to 8 inches in diameter and average about 60 feet high. But from this age on growth is very slow and at 80 years the trees reach a diameter of only from 7½ to 9



inches and a height of 70 feet. Open-grown trees, however, have a much faster diameter growth, and often exceed 15 inches in 80 years.

Jack pine is short lived, and the average age of stands seldom exceeds 80 or 90 years, although trees about 130 years old are sometimes found.

#### SUSCEPTIBILITY TO INJURY.

Diseases and defects are not very common in jack pine up to 60 or 70 years of age, but after that heart rot becomes prevalent, especially on loamy soils. Drought and extremes of temperature have but little effect on the mature tree in its native habitat, but seedlings may be killed by intense cold in the absence of a snow cover.

Fire and wind are the agencies most destructive to jack pine. In severe storms old trees are frequently broken off by the wind. The bark of mature jack pine is very thin, and it is killed by fire more easily than either white or red pine, although the young seedlings, owing to their more rapid growth and greater size, often survive surface fires that kill white and red pine seedlings of the same age.

#### REPRODUCTION.

Jack pine is one of the most prolific seed producers among the pines. In the open trees sometimes begin to bear seed when only 5 years old. Seed is borne in abundance nearly every year, and the percentage of germination is high.

The seeds mature in the first part of September, and dissemination continues for a long period. The seeds, which are light and have comparatively large wings, are often carried long distances by strong winds.

Jack pine is particularly useful in restocking burned areas. A portion of the cones remain closed on the trees for a long time, and are only opened by drying out or by heat. The seeds in this way often survive even severe fires, which cause the cones to open and seed up the burned area.

The seedlings of jack pine are intolerant of shade, though they will grow under a cover of blueberry bushes and other low shrubs. Reproduction also takes place abundantly on bare soil in the open. The presence of leaves and grass on the ground is a great hindrance to reproduction.

#### MANAGEMENT.

Management of even-aged stands on barren soil is best accomplished by clear cutting in strips. These strips should be laid out at right angles to the direction of the prevailing wind. If there is no great danger from fire, the brush should be lopped and scattered over the ground, where by its decay it will contribute organic matter to the soil. Where fire danger is great, brush should be piled in the strips and burned. The standing trees left between the cuttings will serve to

reseed the stripped areas. Clear-cutting in isolated groups is also applicable to jack pine stands, and may sometime be preferable to strip cutting.

In mixed stands on soils better fitted to a superior species, jack pine may prove exceedingly undesirable, and the object of management should be to decrease its proportion or to eliminate it altogether. In mixed stands of red and jack pines, for example, the management on soils well fitted to the former should be by a series of cuttings with the object of decreasing the seed supply of the jack pine and thus making it possible for the more valuable red pine eventually to restock the area completely. On poor soil, less well adapted to red than to jack pine, there is usually little hope of forcing out the jack pine, but such red pine as does succeed in getting a foothold should be encouraged notwithstanding its slower growth, since it will continue to increase in size and value for many years after the growth of the jack pine has practically ceased.

Approved:

JAMES WILSON,

*Secretary of Agriculture.*

WASHINGTON, D. C., May 29, 1909.

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